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Abstract

The paper aims at investigating the effects of social distancing on the number of cases and deaths caused by the COVID-19. A detailed dataset includes more precise measures of the social distancing intensity in 78 municipalities from the state of São Paulo-Brazil that allowed the assessment of the impact on infections and deaths. Controlling for the labor market dynamics, medical infrastructure, and government transfers, we were able to improve our estimates. The evidence indicates that an increase by 1 % on the current social distancing level reduces the number of infections by 4.14 % 7 days later, and by 2.8 % the number of deaths 14 days later.

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1 Introduction

The COVID-19 pandemic constitutes an unprecedented event in recent history. Back in 1918, the most dramatic example is given by the Spanish Flu that evolved in environments characterized by worse sanitary conditions and weaker mobility possibilities. More recently, the epidemic episodes related to the SARS and Ebola outbreaks had a more localized nature. The strong contagion effects of COVID-19, even with asymptomatic individuals, place non-negligible challenges for public policies that aim at deterring the spread of the virus.

The ongoing pandemic leads to substantial public health and economic costs, and not surprisingly, the related literature has experienced exponential growth. Beyond more obvious short and medium terms´ impacts, it is important to note that the pandemic phenomenon may lead to yet unforeseen consequences related to psychological and sociological aspects [see e.g. Brodeur et al. (2021)] and even in longer-term impacts, with the emergence of new forms of workplace organization that may eventually extrapolate short-run adjustments in labor supply [see e.g. von Gaudecker et al. (2020) and Davis et al. (2021)].

The fast spread of COVID-19 seems to have enabled cross-country and large-scale studies that aimed at comparing more general explanatory factors and to make inter-country differences more salient. Liu et al. (2021) pursue a statistical forecast perspective in terms of cross-country dynamic panel data for assessing growth rates of daily COVID-19 active infections. The accuracy of forecasts appears to be favored by the availability of information on local early outbreaks of the infection. In contrast, other cross-country studies attempt to uncover some possible underlying factors, though large-scale cross-country studies do not preclude more specific detailed studies if significant sample heterogeneity is considered to alleviate external validity concerns. In particular, the role of social distancing on the COVID-19 pandemic needs to address various degrees of stringency that in the extreme may be characterized as lockdowns. In fact, Chen et al. (2021) consider cross-country panel data to assess the impact of different types of restrictive policies and the evidence indicates that more extreme interventions such as lockdowns lead to reductions in the transmission rate of COVID-19 and suggest more effective policies that are based on gathering bans. Furthermore, the evidence indicates that stay-at-home restrictions are less effective in countries with larger family sizes and in less developed countries.

Those last remarks are suggestive and inter-country heterogeneities are also detected by Moosa (2020) with time-series analyses for 10 different countries with varying degrees of development. Taking as a reference health outcome classified in terms of seven levels of severity and more aggregate indicators of social distancing, the evidence suggests that restrictive interventions can exert significant effects on COVID-19 outcomes and highlight the more concerning cases of Sweden and Brazil. The study by Benitez et al. (2020) addresses the responses to the pandemic in five Latin American countries in the initial months of the outbreak (in Brazil, Chile, Colombia, Ecuador, and Peru). The authors contend that the greater prevalence of informal labor force and economic inequality would facilitate the virus transmission. In fact, one cannot disregard tendencies towards agglomerations of people in precarious public transportation systems and where there were initial delays in public compensatory policies. The focus of the article was on detailed qualitative information regarding social distancing measures, compensating economic policies, and COVID-19 outcomes in the initial months of the pandemic outbreak. The epidemiological patterns appear to reflect distinct promptness in the adoption of policy measures and also differential structural conditions of the investigated economies where the prevalence of inequalities tends to favor the faster spread of COVID-19.

Altogether, the aforementioned more aggregated studies suggest the necessity of more detailed quantitative studies that also address the mediating roles of different stimulus packages and different social

distancing policies on the evolution of COVID-19 outcomes.

A second strand of the literature pertains to more detailed and country-specific studies on the effects of social distancing under the COVID-19 pandemic. As for studies assessing the impact on economic outcomes, some works are worth mentioning. Fairlie (2020) assesses the impact on the number of active small businesses in the United States in the first 3 months following the inception of stricter social distancing regulations and indicates that specific ethnic groups were subject to particularly strong negative impacts and suggests that the effects of the pandemic can be stronger in poorer segments[1].

Kong and Prinz (2020) provide a state-level study at the United States that combines high-frequency Google search data with information on the adoption of different degrees of social distancing (including restaurant and bar limitations, non-essential business closures, stay-at-home orders, large-gatherings bans, school closures, and emergency declarations). Variations on the timing and location of the restrictions favor the identification of causal effects on unemployment. The article assesses the share of overall growth in unemployment accruing from specific types of interventions. The evidence suggests that the short-run increase in unemployment insurance claims mostly cannot be associated with the aforementioned restrictions but rather would reflect, for example, declines in consumer demand, local policies, and policies implemented by private firms and institutions.

Finally, there are studies focusing on more disaggregated analyses of the impact of social distancing in terms of COVID-19 health outcomes. Wright et al. (2020) have the distinguishing feature of approximating actual dislocation patterns during the initial phase of the pandemic as proxied by cellphone usage. The theoretical motivation attempts to highlight the individuals between perceived contagion chance and the need for pursuing economic activities that imply thresholds for compliance with extreme policies referring to shelter-in-place restrictions. County-day evidence for the U.S. suggests that variations on dislocations following the staggered introduction of the protocols in different locations depending on the degree of economic vulnerability. In fact, relatively stronger dislocations tend to prevail in poorer areas and the increase in unemployment benefits appears to counteract that effect.

Jung et al. (2021) undertake a county-level study for the U.S. and salient results to the importance of poverty in explaining the outcomes in terms of infections and deaths. In particular, the roles of high population density and stay-at-home restrictions in respectively facilitating and curbing the spread of the virus are worth mentioning. Huang (2020) considers a factor imputation methodology to identify the treatment effects of social distancing on daily COVID-19 infections at the county level in the U.S. The evidence indicates a 12 % reduction effect in infections as associated with social distancing policy, although the effects supply heterogeneities in accordance to individual´s income, race, education, and political belief. A common result of some papers relates to social vulnerabilities as facilitating the spread of COVID-19 what is likely to be more dramatic in developing countries. The more descriptive study at the municipality level in Brazil, by Roubaud et al. (2020), provide some initial evidence in that direction [2].

In the present paper, the focus will be on the segment of the literature that assesses the consequences of social distancing on COVID-19 outcomes in terms of high-frequency data on social distancing in the context of municipalities at the state of São Paulo in Brazil. It intends to contribute in at least three aspects:

- At a general level in terms of a detailed consideration of an economy plagued by non-negligible het-

[1] In the next section, we describe stimulus packages tailored for smaller businesses that were implemented in Brazil in the context of the pandemic.

[2] The works by Ajzenman et al. (2020), Huang (2020) and Roubaud et al. (2020) suggest that political beliefs may affect the efficiency of social distancing policies as some segments of the population can be reluctant to adhere to those restrictive measures. Such aspect deserves additional investigations.

erogeneities that are often related to significant inequalities;

- By considering actual social distancing proxies instead of only focusing on the qualitative information on the imposition of restrictive policies that not necessarily are fully enforced;
- By controlling for the mediating role exercised by compensatory policies in terms of specific stimulus packages.

We found that social distancing is important to combat infections and deaths caused by the virus. Our estimates show that an increase of 1 % in the current social distance level reduces the quantity of infections and deaths, 7 and 14 days later, by 4.14, and 2.8 %, respectively. Results are still robust when controlling for fixed-effects, and relevant covariates, such as labor market dynamics, and public compensatory policies. Even 14 and 18 days later, increasing the current social distancing level by 1 %, quantity of infections and deaths caused by the COVID drops 3.67, and 2.5 %, respectively.

The remainder of the paper is organized as follows. The second section provides some background on the COVID-19 pandemic in Brazil and on the related social distancing policies in the context of municipalities in the state of São Paulo in Brazil. The third section discusses the data and the empirical strategy for identifying the aforementioned effects. The fourth section presents and discusses the empirical results. The fifth and final section concludes.

2 Health System and COVID-19 in Brazil: a Brief Background

The first reported case of infection by the COVID-19 was registered in Brazil, on 26/02/2020, and the first death on 12/03/2020, in the city of São Paulo. According to Roubaud et al. (2020), by the end of October 2020, Brazil was the second country in the world with more deaths caused by the virus, and the third on reported cases. Nevertheless, when controlling for the country's population, Brazil is not the most affected.

It is worth mentioning that the numbers presented by the government must be interpreted with caution, as the testing rate was low and underreporting of cases is likely. The number of deaths and cases grew rapidly between March and May but it reached a plateau between mid-May and August, with an average of 1,000 deaths per day. When it comes to cases, the plateau reached 25,000 cases per day, by June. This number increased to around 37,000 in the first half of July, then reached a new peak of 46,000 on average, at the end of July, only to decline from that date. In early October, the moving average was around 25,000 cases per day.

Brazil has a long and successful experience in terms of mass vaccination campaigns that have benefited from the capillarity of its unified health system, In fact, the so-called Sistema Único de Sáude (SUS) was created by the 1988 Constitution and provides free health services to all the people from Brazil. According to Castro et al. (2019), the expansion of the system in the last 30 years was impressive, and even distant regions of the countries are now covered by this national health system.

The pandemic, however, showed how this system needs to be improved and well-funded, as several hospitals and clinics could not deal with the high demand for beds, and the lack of tools and infrastructure, such as ventilators and oxygen cylinders. Nevertheless, despite the referred nation-wide health system, weak social distancing and testing policies coupled with slow efforts for vaccine acquisition did not take advantage of that favorable structure.

To prevent the virus to spread, World Health Organization (WHO) recommended measures of social distancing to the governments. However, as president Jair Bolsonaro, as it was at first the case with the

former president Donald Trump, adopted a lenient speech towards agglomerations of people and on the severity of the pandemic. The Federal government did not adopt top-down policies to face the pandemic and therefore, on 15/04/2020, the Brazilian supreme court [Supremo Tribunal Federal (STF)] acknowledged that mayors and governors were able to delineate local measures to combat the COVID-19. It ended up in a lack of coordination among the different levels of government, and it was not unusual to see a governor or a mayor defending and adopting social distancing measures while some others, using the president's position, were against it.

In the state of São Paulo, the governor implemented a lock-down in all the state's municipalities on 22/03/2020. Bars, restaurants, shopping centers, gyms, etc. could not operate until the flexibilization, which started on 01/06/2020 when the "Plano São Paulo" was implemented. It was developed to ensure a safe and gradual flexibilization of the social distancing measures according to several indicators (deaths, hospital occupation, social distancing, etc.). To let it more clear to the citizens, the government adopted a system of "bandeiras" (flags) to show in each phase [3]of the flexibilization plan a given municipality was.

On the other hand, the Federal government implemented three main programs to mitigate the effects of the pandemic on economic activities. The first and main one is the "Auxílio Emergencial a Pessoas em Situação de Vulnerabilidade" which was approved by Law no. 13,982/2020 in April 2020. It was an emergency income program that provided R$ 600 per month aid to informal workers, unemployed, and other vulnerable citizens. The program was extended until December 2020, and renewed during 2021.

The second, and third programs were the "Programa Emergencial de Manutenção do Emprego e da Renda" (BEm), and the "Programa Nacional de Apoio às Microempresas e Empresas de Pequeno Porte" (PRONAMPE). With the BEm, companies could reduce the journey and salaries of their employees in 25, 50, or 70%, and the government would pay a part of the employee's salary, based on the unemployment benefit. On the other hand, with the PRONAMPE, the government provided special credit lines to small and medium-sized enterprises (SMEs) [4].

3 Empirical strategy

3.1 Data

At the beginning of the pandemic, the state of São Paulo did an agreement with the four biggest telecommunication companies in Brazil and the Instituto de Pesquisas Tecnológicas (IPT), to measure the social distancing in the municipalities from this state. With this aggregated and anonymous data, the "Sistema de Monitoramento Inteligente" de São Paulo (SIMI-SP) was created and an index that goes from 0 to 1 measure the percentage of people in a given municipality that is respecting the social distancing, and it covers 139 municipalities [5]. Thus, we have obtained a daily measure of social distancing.

Information regarding the "auxílio emergencial" was provided by the Ministério da Cidadania, and, thus, we could know the total amount of resources received in each municipality, by month, and by the individual taxpayer registry number [cadastro de pessoa física – CPF].

[3]The system is composed of five flags: red, orange, yellow, green, and blue. The red flag is the most restrictive, with a tight restriction to economic activities and citizens' dislocation. On the other hand, the blue flag reduces drastically these restrictions.

[4]Minimum of R$477.96, and maximum of R$1911.84.

[5]According to the telecommunication service providers, the isolation index is based on the location obtained by the cell phone antennas (Radio Base Stations - ERBs), which "mark" a reference to the place where the cell phone "slept" between 10:00 pm and 2:00 am. During the day, a cell phone that has moved away from this reference (which is variable but, to give you an idea, reaches approximately 200 meters in the city of São Paulo), is considered outside of isolation. All this processing is done by the operator.

The number of cases and deaths caused by the covid was taken from the Secretaria de Estado da Saúde de São Paulo (SES-SP). Therefore, it is possible to know how many people were infected and, eventually, died because of the virus, by day, and municipality. It also provided data about the total population in each municipality, and the georeferenced location of each municipality. This last information was used to measure the distance of the municipalities from the city of São Paulo.

We obtained data related to the total number of ventilators and hospital beds from the DATASUS, which are important tools to treat citizens that were deeply affected by the virus. Moreover, DATASUS also provides data about Gini index, total area, and GDP per capita, by the municipality, and year based on the 2010 Census.

The Ministério da Economia provided information about unemployment insurance, by the municipality, month, and the number of workers applying for the benefit. Furthermore, we obtained data about the total number of fired and hired formal employees by month, and municipality, in the Cadastro Geral de Empregados e Desempregados (CAGED). Another relevant piece of information is the total amount of benefits provided by the Instituto Nacional do Seguro Social (INSS), by municipality and month. This institute was created to increase the social security net and provides several benefits such as pensions, disability, maternity leave, etc.

Information regarding the municipalities where president Jair Bolsonaro won the 2018 election was taken from the CepespData, that is a dataset administrated by the Centro de Política e Economia do Setor Público (CEPESP).

Our dataset starts on March 1, and finishes on August 14 of 2020. Table 1 summarizes the variables used in this article, and their respective frequency for 78 municipalities from the state of São Paulo.

3.2 Model

To estimate the impact of the social distancing measures on deaths and infections caused by the COVID-19, we are going to estimate the following model:

$$Y_{m(t+i)} = \beta_0 + \beta_1 Social\ distancing_{mt} + X'_{mt}\beta + \theta_m + \delta_t + \epsilon_{mt} \tag{1}$$

Where $Y_{m(t+i)}$ is either the total number of infections or deaths per 100,000 inhabitants caused by the COVID-19, in the municipality m, in the day $(t+i)$, where i can be equal to 7 or 14. We choose to use the lead of the outcomes instead of using the current number of infections and deaths, because, according to Bi et al. (2020), the incubation period of the COVID-19 is between 4 and 7 days, and 95% of the patients who developed symptoms will do so within 14 days. Furthermore, Hawryluk et al. (2020) identified that the average time elapsed between the onset of symptoms in Covid-19 patients in Brazil and the date of death is 15.2 days, but varies between 11 and 17, depending on the state in which the case occurs. $Social\ distancing_{mt}$ is the proxy for the proportion of people at home, in the municipality m, and day t. θ_m is the municipality fixed-effect, and δ_t is the day fixed-effect. ϵ_{mt} is the idiosyncratic error.

X'_{mt} is a vector of several controls. One of the most important is the per capita amount of "auxílio emergencial" received by municipality. Another control used is the mean per capita amount of benefit conceded by the INSS in a given municipality. We also have the number of dismissed and hired employees, and the mean amount of unemployment insurance received by the works by the municipality. There is also information about the number of ventilators, and hospital beds per 100,000 habitants by the municipality. Notice that the frequency of these controls is on monthly base. We also obtained controls that only vary yearly:

Gini index, population density, a dummy variable that indicates if Jair Bolsonaro won in that municipality (political preference) in the previous presidential election, distance from the city of São Paulo, and the GDP per capita.

Even with a better measure of social distancing, it is important to control for other factors that may affect the decision of a person to stay at home or not. For example, the "auxílio emergencial" was a benefit created by the Federal government to mitigate the effects of quarantine, and compensate those that lost their jobs or were affected by the measures of social distancing.

The unemployment insurance and the total number of dismissed and hired employees are also relevant because the worker that lost his job will not leave home to work, but may do so to look after a job. On the other hand, workers that were hired and that were not working from home would have to leave to get to work. The same thing happens to the benefits provided by the INSS, as they compose Brazil's main social security net. Therefore, one should expect that this net mitigates the deleterious effects of the pandemic.

The ventilators are an important tool used by patients that fight against the COVID-19. As the virus attacks their lungs, many patients could not breathe well and it could lead to their death. Furthermore, hospital beds are important tools to threat those who were suffering from COVID. The distance from the city of São Paulo was used to control for people, products, and services that circulate from this city to other municipalities in the state of São Paulo, and vice versa. As the capital is the biggest in the country, it is natural that people from other municipalities go to São Paulo, and, during a pandemic, this movement helps the virus to spread.

According to Ajzenman et al. (2020), president Jair Bolsonaro was against social distancing measures promoted by mayors and governors. In his speeches, he minimizes the effects of the pandemic saying that social distancing measures are responsible for the decline in the economic activity and unemployment rise and that is why his electors may not care about the measures to prevent the virus to spread. Thus, the dummy "political preference" controls for the behavior of people from municipalities where the president won the elections.

The fixed-effects were used to control for unobservable characteristics that are fixed over time, and municipalities. We also used random effects to account for controls that are only available at yearly frequency. Therefore, we can use these tools to improve our estimates.

4 Results

In the first and second columns of Table 2, we have the results for the random-effects model. When social distancing increases by 1 %, total infections by the COVID-19 are reduced by 4.16 %, and deaths reduce by 2.79 % after 7, and 14 days respectively.

The INSS expenditure per capita seems to increase the infections in .75 %, but this result is only significant at 10 %. Layoffs reduced the number of infections by 2.28 % and deaths by 1.44 %. Hires, on the other hand, increased the number of infections and deaths, respectively, in 2 % and 1.39 %. The unemployment insurance caused an increase of 3.36 % in the number of infections but this result is only significant at 5 %.

Richer municipalities were less affected by the COVID-19, as the GDP per capita contributed to a reduction of .3 % in the level of infections but this result is only significant at 10 %. Inequality seems to have a positive impact on infections, and the distance from the city of São Paulo reduced the number of infections by .58 % and deaths by .69 %. The fact that president Jair Bolsonaro won the 2018 election in a given municipality did not significantly impact any of the outcome variables.

Notice, however, that the "auxílio emerencial" contributed to an increase of .69 % in infections, and .5 % in deaths. As it was said before, the program was designed to support vulnerable citizens, informal workers, single mothers, etc. Furthermore, it is intended to prevent people to go out and increase the level of infections.

According to Neri (2020), the number of those who lived with less than half the minimum wage in Brazil felt more than 13 million, and the main responsible for the income increase was the "auxílio emergencial". Only 7.43 % of people from this group did rigorous isolation, 44.35 % only left home for essential needs, 46.22 % reduced the contact with other people but received some people at home, and 2 % did any isolation [6]. According to a Datafolha survey, half of the benefit was used to buy food.

One of the main options to have access to the benefit was to withdraw it from a Caixa Econômica Federal branch [7]. Nevertheless, long queues were formed by those how wanted to withdraw the money. The government created a system of different withdraw dates according to the date of birth but it was not enough to prevent agglomerations.

Altogether, it gives us some clues regarding the result of the positive impact of the "auxilio emergencial" on infections and deaths. Most of those who received the benefit were from the group with the lowest level of rigorous isolation, and, as most of the money was used to buy food, they had to leave home to do so. In addition, the precarious withdraw system promoted agglomerations in several cities helping the virus to spread. Thus, the program helped the poorest families to get over the crisis created by the pandemic but its implementation ended up contributing to agglomerations.

Columns three and four show the results for the fixed-effects model. Notice that they did not change much in comparison to the random-effects model. The magnitude of the effects felt stintingly. Unemployment insurance does not impact the number of infections, and INSS benefits still seem to impact the quantity of infections but this result is only significant at 10%.

As a robustness check, we increased the value of i to test if the effects of the chosen independent variables are still significant to explain the quantity of infections 14 days and deaths 18 days later. Table 3 summarizes these results. Notice that the magnitude of some of the coefficients felt, as expected, but they are still significant, especially the social distancing one.

Looking at columns 3 and 4, after 14 and 18 days, respectively, current social distancing reduces the quantity of infections by 3.67 %, and deaths by 2.5 %. Layoffs still have an important impact on the reduction of infections, and deaths, while hires strongly impact these variables positively. The INSS per capita is not significant anymore but the "auxílio emergencial" per capita still increases the quantity of infections, and deaths.

5 Final comments

The COVID-19 pandemic caused a serious impact on people's life in Brazil and abroad. Several workers tried to estimate its impacts on deaths, infections and economic activity, among other outcomes. Moreover, policymakers may face a short-term an apparent trade-off while vaccination is advancing at a slow pace, in Brazil: adopt social distancing measures or keep economic activity running? Notice that erratic social

[6] In comparison to the group just above in the income distribution (those who earn more than half and less than one minimum wage), 24.11 % did a rigorous isolation, 44.42 % only left home for essential needs, 31.29 % reduced the contact with other people but received some people at home, and 0.18 % did any isolation.

[7] This public bank was used to distribute the benefit, as it has the expertise with one the most popular income programs in Brazil: the Bolsa Família.

distancing policies can actually delay a stronger economic recovery [see Janiak et al. (2021)].

In actual practice, the implementation of social distancing measures is not always politically viable, as the lobby of some economic segments that "need agglomeration" to survive is strong. Moreover, several workers lost their jobs during the pandemic, and it can worsen the welfare of a considerable share of the population.

Thus, it is relevant to understand what is the actual impact of social distancing on infections and deaths caused by the COVID-19. This work aims to address this question using a dataset for 78 municipalities of the state of São Paulo that, to the best of our knowledge, has not been widely explored. By using a proxy for the actual degree of social distancing level, by day and municipality, we could go beyond a simple dummy of quarantine. Additionally, we used controls that account for the dynamics of the pandemic in Brazil, such as the "auxílio emergecial" which is one of the main compensatory programs developed by the Brazilian Federal government to mitigate the deleterious effects of the pandemic.

Our estimates show that social distancing measures are important to combat the COVID-19. In fact, current social distancing reduced, according to the results from columns 3 and 4 (Table 2), the number of infections in the next 7 days by 4.14 %, and the number of deaths in the next 14 days by 2.8 %. The results for deaths are suggestive, but one should exercise caution as finer controls for the availability of customized intensive care units were not considered in the analysis. Furthermore, robustness checks demonstrated that current social distancing is still relevant to explain the future level of infections and deaths.

Nevertheless, more research needs to be done on this topic as we only focused in some municipalities from the state of São Paulo, and the channel that makes the "auxílio emergencial" impacts positively the quantity of infections and deaths is not clear yet. Moreover, different avenues for future research can be conceived in terms of the impact of social distancing on other outcomes that relate to economic, environmental and psychological aspects for example.

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Tables

Table 1: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max	Frequency	Source
Social distancing (%)	18564	.474	.063	.25	.75	Daily	SIMI-SP
Infections per 100,000 ininhabitants	18564	347.049	486.554	.017	4191.713	Daily	SES-SP
Deaths per 100,000 inhabitants	18564	15.076	19.797	0	126.215	Daily	SES-SP
Auxílio emergencial per capita (R$)	18138	139.586	40.411	54.841	290.198	Monthly	Ministério da Cidadania
Population density	18564	55.308	308.639	.488	3559.245	Yearly	2010 Census
Gini index	18564	.489	.049	.39	.67	Yearly	2010 Census
Political preference	18564	.993	.085	0	1	Yearly	CEPESP/FGV
INSS benefits per capita (R$)	17757	2.273	.586	.777	4.535	Monthly	INSS
Hires	18564	2135.305	11963.788	29	182041	Monthly	CAGED
Layoffs	18564	2728.889	14860.233	46	216295	Monthly	CAGED
Distance from São Paulo (meters)	18563	149528.69	135619.52	0	569819.12	Yearly	SES-SP
GDP per capita (R$)	18564	47078.894	39148.611	8699.652	311232.03	Yearly	2010 Census
Hospital beds per 100,000 inhabitants	18435	209.925	165.045	0	1419.58	Monthly	DATASUS
Ventilators per 100,000 inhabitants	18564	37.499	23.373	1.731	124.562	Monthly	DATASUS
Unemployment insurance per worker (R$)	10795	1383.467	46.262	1202.863	1476.916	Monthly	Ministério da Economia

Notes: This table describes the dataset used in this work. Infections, deaths, hospitals beds, and ventilators per 100,000 ininhabitants were obtained dividing the total amount of infections and deaths per day by the municipality's population, and then multiplying it by 100,000. The "auxílio emergencial" and the INSS benefits per capita were obtained by taking the total amount of benefits provided by the institute in a given municipality, and dividing it by its total population. Unemployment insurance per worker was obtained dividing the total amount of insurance provided for the workers from a given municipality, by the total number of workers that applied for this insurance in that municipality.

Table 2: Empirical results with shorter lagged effects

	Log(infections 7 days later)	Log(deaths in 14 days later)	Log(infections 7 days later)	Log(deaths in 14 days later)
Log(social distancing)	-4.164***	-2.799***	-4.149***	-2.803***
	(0.103)	(0.0758)	(0.390)	(0.325)
Log(INSS per capita)	0.750***	0.381***	0.774*	0.379
	(0.0600)	(0.0451)	(0.387)	(0.231)
Log(auxílio per capita)	0.691***	0.500***	0.688***	0.497***
	(0.0386)	(0.0266)	(0.140)	(0.0906)
Log(hires)	2.009***	1.396***	1.984***	1.408***
	(0.0335)	(0.0260)	(0.283)	(0.180)
Log(layoffs)	-2.283***	-1.442***	-2.371***	-1.456***
	(0.0381)	(0.0309)	(0.325)	(0.231)
Log(hospital beds)	-0.0796	0.0273	-0.717	-0.476
	(0.0979)	(0.0855)	(0.839)	(0.679)
Log(ventilators)	0.0914	-0.0334	0.0689	-0.0339
	(0.0523)	(0.0407)	(0.498)	(0.186)
Log(unemployment insurance per worker)	3.362**	1.186	2.972	0.329
	(1.289)	(1.053)	(12.10)	(7.105)
Log(GDP per capita)	-0.307*	-0.242	-	-
	(0.148)	(0.138)		
Log(Gini index)	1.716*	0.392	-	-
	(0.726)	(0.685)		
Log(distance from São Paulo)	-0.582***	-0.695***	-	-
	(0.0718)	(0.0672)		
Political preference	1.141	1.041	-	-
	(0.586)	(0.557)		
Constant	-13.97	-0.712	-	-
	(9.319)	(7.662)		
Fixed-effects			X	X
Random-effects	X	X		
N	9524	8524	9524	8524
adj. R^2			0.724	0.689
F			138.3	147.3

Notes: This table shows the result of regression (1) using both random and fixed-effects. Here we have the impact of social distancing and quarantine on infections and deaths caused by the COVID-19 7 and 14 days later, respectively. Standard errors were clustered at the municipality level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3: Empirical results with longer lagged effects

	Log(infections 14 days later)	Log(deaths 18 days later)	Log(infections 14 days later)	Log(deaths 18 days later)
Log(social distancing)	-3.687***	-2.510***	-3.672***	-2.508***
	(0.0970)	(0.0746)	(0.371)	(0.318)
Log(INSS per capita)	0.524***	0.388***	0.546	0.392
	(0.0564)	(0.0440)	(0.358)	(0.229)
Log(auxílio per capita)	0.586***	0.434***	0.587***	0.432***
	(0.0348)	(0.0263)	(0.125)	(0.0876)
Log(hires)	1.869***	1.364***	1.856***	1.365***
	(0.0313)	(0.0254)	(0.253)	(0.178)
Log(layoffs)	-2.082***	-1.424***	-2.161***	-1.453***
	(0.0357)	(0.0300)	(0.293)	(0.221)
Log(hospital beds)	-0.0467	0.0479	-0.780	-0.401
	(0.0959)	(0.0850)	(0.901)	(0.630)
Log(ventilators)	-0.0426	-0.0546	-0.0878	-0.0609
	(0.0499)	(0.0399)	(0.434)	(0.181)
Log(unemployment insurance per worker)	1.553	-0.252	0.532	-1.435
	(1.257)	(1.037)	(11.19)	(6.870)
Log(GDP per capita)	-0.211	-0.192	-	-
	(0.146)	(0.140)		
Log(Gini)	1.561*	0.436	-	-
	(0.721)	(0.693)		
Log(distance from São Paulo)	-0.557***	-0.734***	-	-
	(0.0712)	(0.0679)		
Political preference	0.951	0.971	-	-
	(0.583)	(0.565)		
Constant	-0.949	10.40	-	-
	(9.092)	(7.560)		
Fixed-effects			X	X
Random-effects	X	X		
N	8985	8318	8985	8318
adj. R^2			0.720	0.680
F			123.9	133.1

Notes: This table shows the result of regression (1) using both random and fixed-effects. Here we have the impact of social distancing and quarantine on infections and deaths caused by the COVID-1914 and 18 days later, respectively. Standard errors were clustered at the municipality level. * significant at 10%; ** significant at 5%; *** significant at 1%.